

## Listing of Claims

This listing of claims will replace all prior versions, and listings, of claims in the application. Please cancel claims 1-4, 7, 16, 22-43, and 50, without prejudice or disclaimer.

1.-4. (Cancelled)

5. (Currently Amended) ~~The cell culture of claim 1, wherein the cell culture differentiates into at least 10% neurons under differentiation inducing culture conditions. An in vitro adhesion cell culture comprising at least 90% GFAP<sup>+</sup> cells, wherein~~  
a) one or more cells in the culture have the capacity to differentiate into neurons;  
b) the cell culture divides in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof;  
c) one or more cells in the culture differentiate into neurons upon withdrawal of both serum and the proliferation-inducing growth factor;  
d) wherein greater than 50% of the cells in the culture are nestin<sup>+</sup> under proliferation-promoting culture conditions; and  
e) wherein the cell culture differentiates into at least 10% neurons under differentiation-inducing culture conditions.
6. (Currently Amended) ~~The cell culture of claim 1 or 3, wherein the cell culture differentiates into at least 25% neurons under differentiation inducing culture conditions. An in vitro adhesion cell culture comprising at least 90% GFAP<sup>+</sup> cells, wherein~~  
a) one or more cells in the culture have the capacity to differentiate into neurons;  
b) the cell culture divides in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof;

- c) one or more cells in the culture differentiate into neurons upon withdrawal of both serum and the proliferation-inducing growth factor;
- d) wherein greater than 50% of the cells in the culture are nestin<sup>+</sup> under proliferation-promoting culture conditions; and
- e) wherein the cell culture differentiates into at least 25% neurons under differentiation-inducing culture conditions.

7. (Cancelled)

8. (Currently Amended) ~~The cell culture of claim 1 or 3, wherein the culture is capable of at least 6 doublings. An *in vitro* adhesion cell culture comprising at least 90% GFAP<sup>+</sup> cells, wherein~~

- a) one or more cells in the culture have the capacity to differentiate into neurons;
- b) the cell culture divides in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof;
- c) one or more cells in the culture differentiate into neurons upon withdrawal of both serum and the proliferation-inducing growth factor;
- d) wherein greater than 50% of the cells in the culture are nestin<sup>+</sup> under proliferation-promoting culture conditions; and
- e) wherein the cell culture is capable of at least 6 doublings.

9. (Currently Amended) ~~The cell culture of claim 1 or 3, wherein the culture is capable of at least 12 least doublings. An *in vitro* adhesion cell culture comprising at least 90% GFAP<sup>+</sup> cells, wherein~~

- a) one or more cells in the culture have the capacity to differentiate into neurons;
- b) the cell culture divides in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-

- inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof;
- c) one or more cells in the culture differentiate into neurons upon withdrawal of both serum and the proliferation-inducing growth factor;
- d) wherein greater than 50% of the cells in the culture are nestin<sup>+</sup> under proliferation-promoting culture conditions; and
- e) wherein the cell culture is capable of at least 12 doublings.
10. (Currently Amended) ~~The cell culture of claim 1 or 3, wherein the culture is capable of at least 18 doublings. An *in vitro* adhesion cell culture comprising at least 90% GFAP<sup>+</sup> cells, wherein~~  
a) one or more cells in the culture have the capacity to differentiate into neurons;  
b) the cell culture divides in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof;  
c) one or more cells in the culture differentiate into neurons upon withdrawal of both serum and the proliferation-inducing growth factor;  
d) wherein greater than 50% of the cells in the culture are nestin<sup>+</sup> under proliferation-promoting culture conditions; and  
e) wherein the cell culture is capable of at least 18 doublings.
11. (Currently Amended) ~~The cell culture of claim 1 or 3, wherein the cells are derived from the lateral ganglionie eminence (LGE) or medial ganglionie eminence (MGE) of the mammal. An *in vitro* adhesion cell culture comprising at least 90% GFAP<sup>+</sup> cells, wherein~~  
a) one or more cells in the culture have the capacity to differentiate into neurons;  
b) the cell culture divides in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof;

- c) one or more cells in the culture differentiate into neurons upon withdrawal of both serum and the proliferation-inducing growth factor;
  - d) wherein greater than 50% of the cells in the culture are nestin<sup>+</sup> under proliferation-promoting culture conditions; and
  - e) wherein the cells are derived from the lateral ganglionic eminence (LGE) or medial ganglionic eminence (MGE) of the mammal.
- 12. (Currently Amended) ~~The cell culture of claim 1 or 3, wherein the doubling rate of the culture is faster than seven days. An *in vitro* adhesion cell culture comprising at least 90% GFAP<sup>+</sup> cells, wherein~~
  - a) one or more cells in the culture have the capacity to differentiate into neurons;
  - b) the cell culture divides in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof;
  - c) one or more cells in the culture differentiate into neurons upon withdrawal of both serum and the proliferation-inducing growth factor;
  - d) wherein greater than 50% of the cells in the culture are nestin<sup>+</sup> under proliferation-promoting culture conditions; and
  - e) wherein the doubling rate of the culture is faster than seven days.
- 13. (Currently Amended) ~~The cell culture of claim 1 or 3, wherein the cells in the culture are murine. An *in vitro* adhesion cell culture comprising at least 90% GFAP<sup>+</sup> cells, wherein~~
  - a) one or more cells in the culture have the capacity to differentiate into neurons;
  - b) the cell culture divides in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof;
  - c) one or more cells in the culture differentiate into neurons upon withdrawal of both serum and the proliferation-inducing growth factor;

- d) wherein greater than 50% of the cells in the culture are nestin<sup>+</sup> under proliferation-promoting culture conditions; and
- e) wherein the cells in the cell culture are murine.

14. (Currently Amended) The cell culture of claim 1 or 3, wherein the cells in the culture are human. An *in vitro* adhesion cell culture comprising at least 90% GFAP<sup>+</sup> cells, wherein
- a) one or more cells in the culture have the capacity to differentiate into neurons;
  - b) the cell culture divides in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof;
  - c) one or more cells in the culture differentiate into neurons upon withdrawal of both serum and the proliferation-inducing growth factor;
  - d) wherein greater than 50% of the cells in the culture are nestin<sup>+</sup> under proliferation-promoting culture conditions; and
  - e) wherein the cells in the cell culture are human.

15. (Currently Amended) The cell culture of claim 1 or 3, wherein fewer than 5% of the cells in the culture are  $\beta$ -tubulin III immunoreactive ( $\beta$ -tubulin III<sup>+</sup>) under proliferation-promoting culture conditions and between 10-40% of the cells in the culture are  $\beta$ -tubulin III immunoreactive ( $\beta$ -tubulin III<sup>+</sup>) under differentiation-inducing culture conditions. An *in vitro* adhesion cell culture comprising at least 90% GFAP<sup>+</sup> cells, wherein
- a) one or more cells in the culture have the capacity to differentiate into neurons;
  - b) the cell culture divides in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof;
  - c) one or more cells in the culture differentiate into neurons upon withdrawal of both serum and the proliferation-inducing growth factor;

- d) wherein greater than 50% of the cells in the culture are nestin<sup>+</sup> under proliferation-promoting culture conditions; and
- e) wherein fewer than 5% of the cells in the culture are  $\beta$ -tubulin III immunoreactive ( $\beta$ -tubulin III<sup>+</sup>) under proliferation-promoting culture conditions and between 10-40% of the cells in the culture are  $\beta$ -tubulin III immunoreactive ( $\beta$ -tubulin III<sup>+</sup>) under differentiation-inducing culture conditions.

16. (Canceled)

17. (Currently Amended) ~~The cell culture of claim 3, wherein the culture is an adhesion culture. An *in vitro* cell culture consisting essentially of:~~

- (a) a culture medium containing serum and at least one proliferation-inducing growth factor; and
  - (b) cells derived from the central nervous system of a mammal, wherein:
    - (i) at least 90 % of the cells are glial fibrillary acidic protein immunoreactive (GFAP<sup>+</sup>),
    - (ii) the cells are capable proliferating in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof, and
    - (iii) the cells are capable of differentiating into at least 10% neurons in the absence of both the serum and the proliferation-inducing growth factor from the culture medium;
    - (iv) wherein greater than 50% of the cells in the culture are nestin immunoreactive (*i.e.*, nestin<sup>+</sup>) under proliferation-promoting culture conditions,
- wherein the culture is an adhesion culture.

18. (Currently Amended) ~~The cell culture of claim 1 or 3, wherein at least a portion of the cells in culture differentiate into radial glia in the absence of serum from the culture medium. An *in vitro* adhesion cell culture comprising at least 90% GFAP<sup>+</sup> cells, wherein~~
  - a) one or more cells in the culture have the capacity to differentiate into neurons;
  - b) the cell culture divides in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof;
  - c) one or more cells in the culture differentiate into neurons upon withdrawal of both serum and the proliferation-inducing growth factor;
  - d) wherein greater than 50% of the cells in the culture are nestin<sup>+</sup> under proliferation-promoting culture conditions; and
  - e) wherein at least a portion of the cells in culture differentiate into radial glia in the absence of serum from the culture medium
19. (Previously Presented) The cell culture of claim 18, wherein the radial glia are both GFAP<sup>+</sup> and vimentin positive.
20. (Previously Presented) The cell culture of claim 18, wherein the morphology of the radial glia is:
  - (a) bipolar;
  - (b) elongated; and
  - (c) non-fibrillary.
21. (Currently Amended) ~~The cell culture of claim 1 or 3, wherein at least some of the cells in culture, under differentiation-inducing culture conditions, differentiate into neurons that exhibit:~~
  - (a) ~~axon-dendrite polarity,~~
  - (b) ~~synaptic terminals, and~~
  - (c) ~~localization of proteins involved in synaptogenesis and synaptic activity including~~

- (i) neurotransmitter receptors;
- (ii) transporters, and
- (iii) processing enzymes.

An *in vitro* adhesion cell culture comprising at least 90% GFAP<sup>+</sup> cells, wherein

- a) one or more cells in the culture have the capacity to differentiate into neurons;
- b) the cell culture divides in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof;
- c) one or more cells in the culture differentiate into neurons upon withdrawal of both serum and the proliferation-inducing growth factor;
- d) wherein greater than 50% of the cells in the culture are nestin<sup>+</sup> under proliferation-promoting culture conditions; and
- e) wherein at least some of the cells in culture, under differentiation-inducing culture conditions, differentiate into neurons that exhibit:
  - (i) axon-dendrite polarity,
  - (ii) synaptic terminals, and
  - (iii) localization of proteins involved in synaptogenesis and synaptic activity including
    - (1) neurotransmitter receptors,
    - (2) transporters, and
    - (3) processing enzymes.

22.-43. (Cancelled)

44. (Currently Amended) The method of claim 22 wherein the majority of differentiated neuronal cells are immunoreactive with striatal neuronal markers. A method of producing a neuronal cell *in vitro* comprising the steps of:

- (a) obtaining neural tissue from a mammal, the neural tissue containing at least one GFAP<sup>+</sup>, nestin<sup>+</sup> cell capable of producing progeny that is a GFAP<sup>+</sup>, nestin<sup>+</sup> cell;

- (b) dissociating the neural tissue to obtain a cell suspension comprising said cell;
- (c) culturing the cell suspension in a first culture medium containing serum and at least one proliferation-inducing growth factor to proliferate said GFAP<sup>+</sup>, nestin<sup>+</sup> cell and produce a GFAP<sup>+</sup>, nestin<sup>+</sup> cell progeny, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof; and
- (d) differentiating the cell progeny in a second culture medium that is substantially free of both the serum and the proliferation-inducing growth factor, wherein the majority of differentiated neuronal cells are immunoreactive with striatal neuronal markers.
45. (Previously Presented) The method of claim 44 wherein said striatal neuronal markers are DLX1 and/or MEIS2.
46. (Currently Amended) The method of claim 22 wherein greater than 50% of differentiated neuronal cells are not immunoreactive with cortical neuronal markers. A method of producing a neuronal cell *in vitro* comprising the steps of:
- (a) obtaining neural tissue from a mammal, the neural tissue containing at least one GFAP<sup>+</sup>, nestin<sup>+</sup> cell capable of producing progeny that is a GFAP<sup>+</sup>, nestin<sup>+</sup> cell;
- (b) dissociating the neural tissue to obtain a cell suspension comprising said cell;
- (c) culturing the cell suspension in a first culture medium containing serum and at least one proliferation-inducing growth factor to proliferate said GFAP<sup>+</sup>, nestin<sup>+</sup> cell and produce a GFAP<sup>+</sup>, nestin<sup>+</sup> cell progeny, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof; and
- (d) differentiating the cell progeny in a second culture medium that is substantially free of both the serum and the proliferation-inducing growth factor; wherein greater than 50% of differentiated neuronal cells are not immunoreactive with cortical neuronal markers.

47. (Currently Amended) The method of claim 46 wherein the cortical neuronal markers is PAX6.
48. (Currently Amended) ~~The method of claim 22 wherein greater than of differentiated neuronal cells are not immunoreactive with neuronal markers of the medial ganglionic eminence. A method of producing a neuronal cell *in vitro* comprising the steps of:~~  
(a) obtaining neural tissue from a mammal, the neural tissue containing at least one GFAP<sup>+</sup>, nestin<sup>+</sup> cell capable of producing progeny that is a GFAP<sup>+</sup>, nestin<sup>+</sup> cell;  
(b) dissociating the neural tissue to obtain a cell suspension comprising said cell;  
(c) culturing the cell suspension in a first culture medium containing serum and at least one proliferation-inducing growth factor to proliferate said GFAP<sup>+</sup>, nestin<sup>+</sup> cell and produce a GFAP<sup>+</sup>, nestin<sup>+</sup> cell progeny, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof; and  
(d) differentiating the cell progeny in a second culture medium that is substantially free of both the serum and the proliferation-inducing growth factor;  
wherein greater than 50% of differentiated neuronal cells are not immunoreactive with neuronal markers of the medial ganglionic eminence.
49. (Previously Presented) The method of claim 48 wherein one of said neuronal markers of the medial ganglionic eminence is NKX2.1.
50. (Cancelled)
51. (Currently Amended) ~~The culture of claim 1 or 3 wherein greater than 50% of differentiated neuronal cells are immunoreactive with striatal neuronal markers. An *in vitro* adhesion cell culture comprising at least 90% GFAP<sup>+</sup> cells, wherein~~  
a) one or more cells in the culture have the capacity to differentiate into neurons;  
b) the cell culture divides in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-

- inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof;
- c) one or more cells in the culture differentiate into neurons upon withdrawal of both serum and the proliferation-inducing growth factor;
- d) wherein greater than 50% of the cells in the culture are nestin<sup>+</sup> under proliferation-promoting culture conditions; and
- e) wherein greater than 50% of differentiated neuronal cells are immunoreactive with striatal neuronal markers
52. (Previously presented) The culture of claim 51 wherein said striatal neuronal markers are DLX1 and/or MEIS2.
53. (Currently Amended) ~~The culture of claim 1 or 3 wherein greater than 50% of differentiated neuronal cells are immunoreactive with cortical neuronal markers. An *in vitro* adhesion cell culture comprising at least 90% GFAP<sup>+</sup> cells, wherein~~  
a) one or more cells in the culture have the capacity to differentiate into neurons;  
b) the cell culture divides in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof;  
c) one or more cells in the culture differentiate into neurons upon withdrawal of both serum and the proliferation-inducing growth factor;  
d) wherein greater than 50% of the cells in the culture are nestin<sup>+</sup> under proliferation-promoting culture conditions; and  
e) wherein greater than 50% of differentiated neuronal cells are not immunoreactive with cortical neuronal markers
54. (Currently Amended) The culture of claim 53 wherein the cortical neuronal markers is PAX3PAX6.

55. (Currently Amended) The culture of claim 1 or 3 wherein greater than 50% of differentiated neuronal cells are not immunoreactive with neuronal markers of the medial ganglion eminence. An *in vitro* adhesion cell culture comprising at least 90% GFAP<sup>+</sup> cells, wherein
- a) one or more cells in the culture have the capacity to differentiate into neurons;
  - b) the cell culture divides in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof;
  - c) one or more cells in the culture differentiate into neurons upon withdrawal of both serum and the proliferation-inducing growth factor;
  - d) wherein greater than 50% of the cells in the culture are nestin<sup>+</sup> under proliferation-promoting culture conditions; and
  - e) wherein greater than 50% of differentiated neuronal cells are not immuno reactive with neuronal markers of the medial ganglion eminence.
56. (Previously Presented) The culture of claim 55 wherein one of said neuronal markers of the medial ganglionic eminence is NKX2.1.
57. (New) An *in vitro* cell culture consisting essentially of:
- (a) a culture medium containing serum and at least one proliferation-inducing growth factor; and
  - (b) cells derived from the central nervous system of a mammal, wherein:
    - (i) at least 90 % of the cells are glial fibrillary acidic protein immunoreactive (GFAP<sup>+</sup>),
    - (ii) the cells are capable proliferating in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof,

- (iii) the cells are capable of differentiating into at least 10% neurons in the absence of both the serum and the proliferation-inducing growth factor from the culture medium; and
- (iv) wherein greater than 50% of the cells in the culture are nestin immunoreactive under proliferation-promoting culture conditions, and
- (v) wherein the cell culture differentiates into at least 25 % neurons under differentiation-inducing culture conditions.

58. (New) An *in vitro* cell culture consisting essentially of:

- (a) a culture medium containing serum and at least one proliferation-inducing growth factor; and
- (b) cells derived from the central nervous system of a mammal, wherein:
  - (i) at least 90 % of the cells are glial fibrillary acidic protein immunoreactive (GFAP<sup>+</sup>),
  - (ii) the cells are capable proliferating in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof,
  - (iii) the cells are capable of differentiating into at least 10% neurons in the absence of both the serum and the proliferation-inducing growth factor from the culture medium; and
  - (iv) wherein greater than 50% of the cells in the culture are nestin immunoreactive under proliferation-promoting culture conditions, and
  - (v) wherein the cell culture is capable of at least 6 doublings.

59. (New) An *in vitro* cell culture consisting essentially of:

- (a) a culture medium containing serum and at least one proliferation-inducing growth factor; and
- (b) cells derived from the central nervous system of a mammal, wherein:
  - (i) at least 90 % of the cells are glial fibrillary acidic protein immunoreactive (GFAP<sup>+</sup>),
  - (ii) the cells are capable proliferating in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof,
  - (iii) the cells are capable of differentiating into at least 10% neurons in the absence of both the serum and the proliferation-inducing growth factor from the culture medium; and
  - (iv) wherein greater than 50% of the cells in the culture are nestin immunoreactive under proliferation-promoting culture conditions, and
  - (v) wherein the cell culture is capable of at least 12 doublings.

60. (New) An *in vitro* cell culture consisting essentially of:

- (a) a culture medium containing serum and at least one proliferation-inducing growth factor; and
- (b) cells derived from the central nervous system of a mammal, wherein:
  - (i) at least 90 % of the cells are glial fibrillary acidic protein immunoreactive (GFAP<sup>+</sup>),
  - (ii) the cells are capable proliferating in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof,

- (iii) the cells are capable of differentiating into at least 10% neurons in the absence of both the serum and the proliferation-inducing growth factor from the culture medium; and
- (iv) wherein greater than 50% of the cells in the culture are nestin immunoreactive under proliferation-promoting culture conditions, and
- (v) wherein the cell culture is capable of at least 18 doublings.

61. (New) An *in vitro* cell culture consisting essentially of:

- (a) a culture medium containing serum and at least one proliferation-inducing growth factor; and
- (b) cells derived from the central nervous system of a mammal, wherein:
  - (i) at least 90 % of the cells are glial fibrillary acidic protein immunoreactive (GFAP<sup>+</sup>),
  - (ii) the cells are capable proliferating in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof,
  - (iii) the cells are capable of differentiating into at least 10% neurons in the absence of both the serum and the proliferation-inducing growth factor from the culture medium; and
  - (iv) wherein greater than 50% of the cells in the culture are nestin immunoreactive under proliferation-promoting culture conditions, and
  - (v) wherein the cells are derived from the lateral ganglionic eminence (LGE) or medial ganglionic eminence (MGE) of the mammal.

62. (New) An *in vitro* cell culture consisting essentially of:

- (a) a culture medium containing serum and at least one proliferation-inducing growth factor; and
- (b) cells derived from the central nervous system of a mammal, wherein:
  - (i) at least 90 % of the cells are glial fibrillary acidic protein immunoreactive (GFAP<sup>+</sup>),
  - (ii) the cells are capable proliferating in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof,
  - (iii) the cells are capable of differentiating into at least 10% neurons in the absence of both the serum and the proliferation-inducing growth factor from the culture medium; and
  - (iv) wherein greater than 50% of the cells in the culture are nestin immunoreactive under proliferation-promoting culture conditions, and
  - (v) wherein the doubling rate of the culture is faster than seven days.

63. (New) An *in vitro* cell culture consisting essentially of:

- (a) a culture medium containing serum and at least one proliferation-inducing growth factor; and
- (b) cells derived from the central nervous system of a mammal, wherein:
  - (i) at least 90 % of the cells are glial fibrillary acidic protein immunoreactive (GFAP<sup>+</sup>),
  - (ii) the cells are capable proliferating in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is

selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof,

- (iii) the cells are capable of differentiating into at least 10% neurons in the absence of both the serum and the proliferation-inducing growth factor from the culture medium; and
- (iv) wherein greater than 50% of the cells in the culture are nestin immunoreactive under proliferation-promoting culture conditions, and
- (v) wherein the cells in the culture are murine.

64. (New) An *in vitro* cell culture consisting essentially of:

- (a) a culture medium containing serum and at least one proliferation-inducing growth factor; and
- (b) cells derived from the central nervous system of a mammal, wherein:
  - (i) at least 90 % of the cells are glial fibrillary acidic protein immunoreactive (GFAP $^+$ ),
  - (ii) the cells are capable proliferating in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof,
  - (iii) the cells are capable of differentiating into at least 10% neurons in the absence of both the serum and the proliferation-inducing growth factor from the culture medium; and
  - (iv) wherein greater than 50% of the cells in the culture are nestin immunoreactive under proliferation-promoting culture conditions, and
  - (v) wherein the cells in the culture are human.

65. (New) An *in vitro* cell culture consisting essentially of:

- (a) a culture medium containing serum and at least one proliferation-inducing growth factor; and
- (b) cells derived from the central nervous system of a mammal, wherein:
  - (i) at least 90 % of the cells are glial fibrillary acidic protein immunoreactive (GFAP<sup>+</sup>),
  - (ii) the cells are capable proliferating in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof,
  - (iii) the cells are capable of differentiating into at least 10% neurons in the absence of both the serum and the proliferation-inducing growth factor from the culture medium; and
  - (iv) wherein greater than 50% of the cells in the culture are nestin immunoreactive under proliferation-promoting culture conditions, and
  - (v) wherein fewer than 5% of the cells in the culture are  $\beta$ -tubulin III immunoreactive ( $\beta$ -tubulin III<sup>+</sup>) under proliferation-promoting culture conditions and between 10-40% of the cells in the culture are  $\beta$ -tubulin III immunoreactive ( $\beta$ -tubulin III<sup>+</sup>) under differentiation-inducing culture conditions.

66. (New) An *in vitro* cell culture consisting essentially of:

- (a) a culture medium containing serum and at least one proliferation-inducing growth factor; and
- (b) cells derived from the central nervous system of a mammal, wherein:
  - (i) at least 90 % of the cells are glial fibrillary acidic protein immunoreactive (GFAP<sup>+</sup>),

- (ii) the cells are capable proliferating in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof,
- (iii) the cells are capable of differentiating into at least 10% neurons in the absence of both the serum and the proliferation-inducing growth factor from the culture medium; and
- (iv) wherein greater than 50% of the cells in the culture are nestin immunoreactive under proliferation-promoting culture conditions, and
- (v) wherein at least a portion of the cells in culture differentiate into radial glia in the absence of serum from the culture medium.

67. (New) The cell culture of claim 66, wherein the radial glia are both GFAP $^+$  and vimentin positive.
68. (New) The cell culture of claim 66, wherein the morphology of the radial glia is:
- (a) bipolar;
  - (b) elongated; and
  - (c) non-fibrillary.
69. (New) An *in vitro* cell culture consisting essentially of:
- (a) a culture medium containing serum and at least one proliferation-inducing growth factor; and
  - (b) cells derived from the central nervous system of a mammal, wherein:
    - (i) at least 90 % of the cells are glial fibrillary acidic protein immunoreactive (GFAP $^+$ ),
    - (ii) the cells are capable proliferating in a culture medium containing serum and at least one proliferation-inducing growth factor,

wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof,

- (iii) the cells are capable of differentiating into at least 10% neurons in the absence of both the serum and the proliferation-inducing growth factor from the culture medium; and
- (iv) wherein greater than 50% of the cells in the culture are nestin immunoreactive under proliferation-promoting culture conditions, and
- (v) wherein at least some of the cells in culture, under differentiation-inducing culture conditions, differentiate into neurons that exhibit:
  - (1) axon-dendrite polarity,
  - (2) synaptic terminals, and
  - (3) localization of proteins involved in synaptogenesis and synaptic activity including
    - (A) neurotransmitter receptors,
    - (B) transporters, and
    - (C) processing enzymes.

70. (New) An *in vitro* cell culture consisting essentially of:

- (a) a culture medium containing serum and at least one proliferation-inducing growth factor; and
- (b) cells derived from the central nervous system of a mammal, wherein:
  - (i) at least 90 % of the cells are glial fibrillary acidic protein immunoreactive (GFAP $^+$ ),
  - (ii) the cells are capable proliferating in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof,

- (iii) the cells are capable of differentiating into at least 10% neurons in the absence of both the serum and the proliferation-inducing growth factor from the culture medium; and
  - (iv) wherein greater than 50% of the cells in the culture are nestin immunoreactive under proliferation-promoting culture conditions, and
  - (v) wherein greater than 50% of differentiated neuronal cells are immunoreactive with striatal neuronal markers.
71. (New) The culture of claim 70 wherein said striatal neuronal markers are DLX1 and/or MEIS2.
72. (New) An *in vitro* cell culture consisting essentially of:
- (a) a culture medium containing serum and at least one proliferation-inducing growth factor; and
  - (b) cells derived from the central nervous system of a mammal, wherein:
    - (i) at least 90 % of the cells are glial fibrillary acidic protein immunoreactive (GFAP<sup>+</sup>),
    - (ii) the cells are capable proliferating in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof,
    - (iii) the cells are capable of differentiating into at least 10% neurons in the absence of both the serum and the proliferation-inducing growth factor from the culture medium; and
    - (iv) wherein greater than 50% of the cells in the culture are nestin immunoreactive under proliferation-promoting culture conditions, and

- (v) wherein greater than 50% of differentiated neuronal cells are not immunoreactive with cortical neuronal markers.

73. (New) The culture of claim 72 wherein the cortical neuronal marker is PAX6.

74. (New) An *in vitro* cell culture consisting essentially of:

- (a) a culture medium containing serum and at least one proliferation-inducing growth factor; and
- (b) cells derived from the central nervous system of a mammal, wherein:
  - (i) at least 90 % of the cells are glial fibrillary acidic protein immunoreactive (GFAP<sup>+</sup>),
  - (ii) the cells are capable proliferating in a culture medium containing serum and at least one proliferation-inducing growth factor, wherein the at least one proliferation-inducing growth factor is selected from the group consisting of EGF, amphiregulin, aFGF, bFGF, TGF $\alpha$ , and combinations thereof,
  - (iii) the cells are capable of differentiating into at least 10% neurons in the absence of both the serum and the proliferation-inducing growth factor from the culture medium; and
  - (iv) wherein greater than 50% of the cells in the culture are nestin immunoreactive under proliferation-promoting culture conditions, and
  - (v) wherein greater than 50% of differentiated neuronal cells are not immunoreactive with neuronal markers of the medial ganglion eminence.

75. (New) The culture of claim 74 wherein one of said neuronal markers of the medial ganglionic eminence is NKX2.1.